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ARKANSAS ACADEMY OF SCIENCE

ABSTRACTS OF PAPERS PRESENTED AT THE THIRTY-SIXTH ANNUAL MEETING

Arkansas State College, Jonesboro

April 25-26, 1952

BIOLOGY SECTION

Chairman: W. C. Munn, Southern State College

B-1-1

The Comparative Amount of Chlorophylls and Other Pigments in Plants Grown With Various Mineral Deficiencies. Jean Rosser Williams, Arkansas State College.

The object of this work was to determine the optimum controlling mineral in the production of chlorophylls; also, to determine the relationship of xanthophyll and carotene to the chlorophylls.

Corn, soy beans, and tomatoes were grown in clean sand with carefully prepared diets. Plants grown with full diets were used as controls. Each type of plant was given diets deficient in potassium, phosphorus, calcium, magnesium, and nitrogen.

Chlorophylls, extracted with acetone each week during growth, were carefully compared with a series of chlorophyll solutions to obtain a quantitative ratio.

In order to make a quantitative comparison of carotene, xanthophyll, and chlorophylls, a petroleum-benzene extraction of these pigments was separated by drawing the extract through a column of powdered sucrose.

Root systems were preserved and measured. All imperfections of the plants were recorded during growth.

B-4-4

Rediscovery of the Bigleaf Magnolia in Arkansas. Dwight M. Moore, University of Arkansas.

The Bigleaf Magnolia (*Magnolia macrophylla Michx.*), first reported from Arkansas by R. Ellsworth Call in the State Geologic Report for 1889 from three trees observed south of Forrest City, has been practically unobserved since that time. In 1939 specimens were sent in from Clay County and identified as this species. Search for these trees was hindered by the death of the man who had found them. In June, 1951, after several previous and futile attempts, a good stand of these trees was found in Clay County, about 11 miles west of Piggott.

B-5-5

Heterosis in Maize Embryos. R. S. Fairchild, University of Arkansas.

This investigation was undertaken to explore the possibility that heterosis may be expressed in histological and morphological development of different parts of the maize embryo.

A split-ear pollination technique was employed so that inbred and hybrid embryos were grown on the same ears. Embryos of inbreds and reciprocal hybrids were studied at 5-day intervals until morphologically mature.

Developmental expressions of heterosis are evident in the plumule, radicle, and seminal roots.

B-7-7

Hyaluronidase in Tissues of Normal and Tumor Experimental Animals. Louis R. Fina, University of Arkansas.

Hyaluronidase determinations made on eight fibrosarcomas of mice and six fibroadenomas of rats under rigidly aseptic conditions indicated that fibrosarcoma had about one-tenth the hyaluronidase activity of testis tissue, and about 10 times the activity of fibro-adenoma. The kidney and spleen of tumor-bearing animals contained approximately the same amount of enzyme as the tumor of these animals. By the same turbidimetric method, normal spleen showed no activity and normal kidney had only slight activity. Bacteria were found to be present in many tumors but apparently were not responsible for the hyaluronidase activity of the tumor tissue. (Investigation supported, in part, by a research grant from the Damon Runyon Memorial Fund for Cancer Research.)

B-10-10

The Nutritive Value of Certain Lespedeza Hays for Wintering Dairy Heifers. Ed D. Moore, Lantis Ratcliff, and James L. Cason, University of Arkansas.

Sericea and Korean lespedeza hays were compared for wintering dairy heifers in a 91-day feeding trial. The group fed Sericea lespedeza hay *ad libitum* gained 0.46 pounds per animal

per day, consumed 33.7 pound of hay per pound of gain and refused 18.5 per cent of the hay fed. Heifers fed Korean lespedeza hay gained 1.03 pounds per animal per day, consumed 17.4 pounds of hay per pound of gain and refused 12.5 per cent of the hay fed.

In a trial with younger animals one group fed $3/4$ pound of grain per 100 pounds of body weight with Korean lespedeza hay gained 0.88 pound per animal per day and consumed 9.1 pounds of hay per pound of gain while a comparable group fed $1/2$ pound of grain per 100 pounds of body weight gained 0.74 pound per animal per day and consumed 11.9 pounds of hay per pound of gain.

B-12-12

Effectiveness of Implanted Bacitracin on the Growth of Suckling Pigs. Dennis L. Tucker, P. R. Noland, and E. L. Stephenson, University of Arkansas.

A total of 207 suckling pigs was used to determine the effect of implanting bacitracin on growth rate. Of these animals, 59 were used as controls, 56 were implanted with 1,000 units of bacitracin, 44 were given 2,000 units, and 48 received 4,000 units of the antibiotic. The 56-day weights of these pigs were 26.08, 29.02, 27.18, and 27.40 pounds, respectively. The treated pigs were significantly heavier than the unimplanted controls at this age. The differences among the implanted pigs were not significant. However, the 1,000-unit level of treatment apparently was more nearly optimum than the higher levels of implantation. The results of this work tend to minimize the possibility that the action of bacitracin is entirely an intestinal bacteriostatic action.

CHEMISTRY SECTION

Chairman: Morton Dworshak, College of the Ozarks

C-1-19

Pharmaceutical Chemistry. R. O. Bachmann, University of Arkansas.

Pharmaceutical chemistry undertakes to explain the chemical and physical principles involved in incompatibilities, stability, storage, and medicinal and pharmaceutical uses of inorganic and organic medicinal chemicals. In the study of organic medicinal agents, the student investigates relationships between chemical structure and activity. Pharmaceutical analysis undertakes to explain the chemical and physical principles, procedures, and instrumentation involved in the analysis and standardization of crude drugs and refined medicinal agents from plant and animal sources, prepared synthetically, and inorganic and organic medicinal agents and preparations thereof.

C-2-20

Some Derivatives of Styrene. William K. Noyce, University of Arkansas.

Several compounds related to styrene have been under consideration in connection with their use as intermediates for further synthetic work.

Among the new compounds that have been prepared are p-propoxy- β -nitrostyrene, propyl 3-nitro-4-chlorocinnamate, p-ethoxy- β -methyl- β -nitrostyrene and p-ethoxy- β -methyl- β -nitrostyrene dibromide. Also, 3-nitro-4-chlorocinnamic acid has been prepared by a new method.

In certain cases, reactions which were successfully used in these syntheses have been found to be unsatisfactory when applied to homologs of these compounds. Some of these anomalies are under study.

C-3-21

Application of Glass Blowing to Scientific Research. W. J. Wheeler, University of Arkansas.

Custom-made glassware is an important factor in the expansion of laboratories and scientific research. The unique physical and chemical properties of glass adapt it to experimentation. Production of glassware has evolved with research techniques. Complex, specialized apparatus has been developed as research has become specialized. Cooperation between glass workers and research workers permits large and complicated apparatus, especially designed for specific problems, to be built quickly and easily.

C-5-23

Abnormal Surface Energies Exhibited by Atomized Sodium Chloride. E. D. Jones, D. S. Burgess and E. S. Amis, University of Arkansas.

Sodium chloride has been obtained in the form of spherical particles by wheel atomization. Each particle is formed by the quenching of a molten droplet of sodium chloride at 800°C. These particles behave in a manner normally associated with a very high degree of subdivision. This behavior is attributed to surface energy provided by a strained lattice.

Experimental procedures used for study of the phenomena include hygroscopicity measurement, measurement of EMF of concentration cells, calorimetry of heats of solution, and radioisotope tracing procedures. The experimental work is described.

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C-8-26

Chicken Feathers as the Basis of a New Arkansas Industry. Art W. McCloy, University of Arkansas.

Growth of the broiler industry in Arkansas has brought the problem of disposing of the feathers. Current methods are both expensive and troublesome. This investigation sought new uses for the feathers. A feather still was designed to separate the soft, fluffy feathers from the stiff, heavy feathers. The lighter feathers were used to make pillows and cold weather garments. The semi-heavy feathers were processed and the fine, lace-like parts of the feathers were added to the lighter fraction. The stems were added to the rougher fraction, which was heated with lime under pressure to produce a nitrogen-rich fertilizer.

C-9-27

The Effects of Pressure on Heat Transfer Through Fabrics and Quilted Material. William G. Roberts, University of Arkansas.

Several fabrics of different weaves and materials were tested for heat transmission in an apparatus in which the temperature was kept constant by boiling water. Varying pressures were exerted on each sample and the results were plotted as Btu's per hour passed through the sample per degree F per square foot *vs.* pressure in pounds per square inch.

The plots indicate that for each type of fabric (except hard felts) there is a critical pressure at which the heat transmission of the cloth is greatly accelerated.

An attempt was made to correlate the test results with fabric weave, fiber, density, and other factors and to correlate the results of laboratory testing with results obtained on the same fabrics in wearing tests on the "Metal Man" of the University of Arkansas, used to determine warmth of clothing under a wide variety of weather and wearing conditions.

C-10-28

Simultaneous Spectrophotometric Determination of Iron (III) and Iron (II) with Orthophenanthroline. John A. Smart and Aubrey E. Harvey, University of Arkansas.

The red complex of Iron (II) and orthophenanthroline is customarily used to determine this element. It has been observed that the blue oxidation product of the red complex changes on standing to a yellow complex. The yellow complex may be formed directly by adding orthophenanthroline to a solution containing ferric ions. Absorption curves for the ferrous and ferric complexes show the extinction coefficients to be equal at a wave length of 392 $m\mu$. A method is proposed here for determining ferric and ferrous ions in the same solution by means of the orthophenanthroline complexes. Extinction measurements at 392 $m\mu$ are plotted against total ion to give the first standard curve. A second standard curve of extinction against concentration of Iron (II) is obtained at a wave length of 512 $m\mu$. Thus, concentration of Iron (II) is determined directly, and concentration of Iron (III) is obtained by subtraction.

C-11-29

Undergraduate Inorganic Chemistry. Robert W. Rowden, University of Arkansas.

The structural approach appears to be best adapted to a college course in inorganic chemistry. In addition to providing a brief introduction to spectroscopy, quantum mechanics, and nuclear chemistry, it leads directly into periodicity, inorganic complex compounds (including nomenclature), stereochemistry, and acid-base theories. Descriptive work on the transition elements, rare earth elements, and selected non-metals (the halogens) would be profitable.

GEOLOGY SECTION

Chairman: N. F. Williams, Arkansas Resources and Development Commission

G-5-34

Recently-recognized Details of Geologic Structure at Hot Springs, Arkansas. Robert H. Arndt and Raymond B. Strond, University of Arkansas.

Aerial photographs and field mapping reveal structural discontinuities on North Mountain and Hot Springs Mountain. North Mountain is partly the overturned limb of a large anticline. It is supported by massive Arkansas novaculite and Hot Springs sandstone. Truncation of the outcrop of the Hot Springs sandstone in the syncline which lies between North Mountain and Hot Springs Mountain indicates the beds are faulted. Intensely fractured and sheared zones in the massive Arkansas novaculite possibly represent the trace of faulting where it passes into novaculite.

At least one, and possibly three, major faults may exist in the area which includes portions of North Mountain, Hot Springs Mountain, and Indian Mountain. The faults are classified

tentatively either as stretch thrusts or as break thrusts, the overthrust part of which moved toward the southeast. However, it is possible that some faults may be high-angle reverse faults in which the southeastern wall forms the hanging wall.

G-7-36

Distribution of Radioactivity in Uranium-bearing rocks from Potash Sulphur Springs, Garland County, Arkansas. James W. Baxter, University of Arkansas.

Small but appreciable quantities of uranium are associated with the syenitic igneous rocks of the Potash Sulphur Springs complex. Radiometric studies of crushed and sieve-sized fractions of the rocks indicate the finer sieve fractions are, in general, somewhat more radioactive. One series of sieve fractions was separated into fractions of different specific gravity. The heavier fractions are more radioactive. Autoradiographic studies show the activity of the individual grains and the nature of the spatial distribution of the radioactive minerals in the rock. The activity of the individual grains is recognized after 15 to 20 days' exposure of grains trapped on water-softened, alpha-sensitive nuclear track plates. The spatial distribution of the radioactive minerals in the rock is determined by exposing thin sections of rock material to alpha-beta sensitive nuclear track stripping film.

HISTORY AND POLITICAL SCIENCES SECTION

Chairman: Georg G. Iggers, Philander Smith College

HP-1-38

"Automatic" Reapportionment for the Arkansas General Assembly. Franklin M. Bridge, University of Arkansas.

With the reapportioning and redistricting of the 35 seats in the Arkansas State Senate by the Supreme Court of the State, Arkansas has found a way to solve one of the most persistent problems of state government. After 36 years in which the legislature failed to obey the constitutional mandate to redistrict and reapportion its seats after each national census, the people of the state, in 1936, by an initiated amendment, divested the legislature of the power to do so. Amendment 23 lodges the duty to reapportion and redistrict legislative seats in a Board of Apportionment made up of the Governor, Secretary of State, and Attorney General, but the real "teeth" of the amendment lie in the provision that the Supreme Court may, on petition of any citizen, mandamus the Board to act if it fails to do so, or the Court may itself reapportion and redistrict the State.

Amendment 23 has operated effectively: twice after the census of 1940 and again after that of 1950. Changes were fought bitterly in both cases on personal and political grounds. Although in both cases the reapportionment and redistricting was accomplished in part by action of the Board of Apportionment, there can be little doubt that if the function had been left to elective officers of the executive branch alone, the problem would not have been solved adequately. In both instances of application of Amendment 23, it was either direct Supreme Court action or the threat of it which produced results. While it may be argued that the reapportioning and redistricting of legislative seats is not properly a judicial function, the conclusion is inescapable that the people of Arkansas, by using the Supreme Court for that purpose, have found a way to solve a most difficult governmental problem.

HP-2-39

The Threat and the Promise of Power Politics. Ralph G. Jones, University of Arkansas.

This article attempts a re-examination of the power relationships of the twentieth century and a reassessment of America's position in its era of Western leadership. Its basic premise is that while political and economic power came to Europe during the nineteenth century, political power--and political power only--has come to Asia and Africa in the twentieth century. The United States, as the *de facto* leader of the Western bloc, must seek to understand, direct, and control this new power in the East, and to aid in its implementation with economic power. Americans must face the fact that revolutions on at least two continents are already upon us. It remains to be seen whether the United States can and will influence the course of these revolutions.

Assumption of Western leadership by the United States involves more than a superficial change from "isolationism" to "internationalism." It involves a reconsideration of fundamental principles and practices regarding power itself. It is suggested that American experience--and this experience is based on unquestioned successes in the nineteenth century--has tended toward the neutralization of power. Examples from both the political and the economic spheres will be put forward. Americans must face the responsibility of power--and face it not by trying to neutralize power in Asia and Africa, but by trying to channel it into responsible hands.

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PHYSICS SECTION

Chairman: M. L. Lawson, Arkansas State College

P-1-46

Interferometric Determination of the Magnetostriction Constant of Bar-shaped Samples. Z. V. Harvalik, University of Arkansas.

An interferometer, which permits the measurement of the magnetostriction constant of various bar-shaped materials, is described. The interferometer consists of one optical flat attached to the specimen, and of another optical flat separated by an air-gap from the specimen flat. The shift of the interference lines is measured with a measuring microscope. Considering the wave length of the light (sodium vapor lamp as source) used to produce the interference lines, the magnitude of elongation or striction of the specimen can be calculated and correlated to the magnetic flux intensities in the bar. The magnetic flux is produced inside of a coil electrically, into which the specimen bar is inserted.

P-2-47

A Low Thermal Capacity Thermocouple by Evaporation Methods. R. W. Raible and R. M. Pierson, University of Arkansas.

A thermocouple made by evaporation of metal films on thin substrates is described and construction details are given.

Sensitivity curves (thermal E.M.F. vs. source temperature) and response times to thermal equilibrium are given for various combinations of metals.

P-3-48

Diffusion Cloud Chamber. B. J. Good, University of Arkansas.

A downward diffusion cloud chamber is discussed and is demonstrated. This chamber is approximately 6 inches high and has a diameter of 11 inches. A porous ceiling saturated with a liquid acts as the vapor source. The temperature at the top of the chamber may be varied by the use of a resistive-type heating element. The bottom is placed in direct contact with dry ice. Variation of the two temperatures defines the necessary temperature gradient and allows some flexibility of operation.

P-4-49

Alpha-ray Spectrometer for Determination of Radioactive Gases. P. E. Damon and H. I. Hyde, University of Arkansas.

A scintillation-counter alpha-ray spectrometer is being developed for the determination of the radioactive gases thoron, radon, and actinon. The instrument consists of a hermetically-sealed chamber, lined with zinc sulfide phosphor, except for a lucite window at one end through which the chamber is viewed by an RCA 5819 photomultiplier tube. After evacuating the counting chamber, a flask containing a water sample and its associated gases is opened to the system, allowing the accumulated gases to enter the chamber. An alpha particle emitted by a radioactive gas atom will strike the zinc sulfide phosphor with little ionization in transit. Its kinetic energy will be converted into a proportional number of light quanta. These, in turn, will produce photoelectrons at the cathode of the photomultiplier. These electrons are multiplied by secondary emission in the photomultiplier tube, and amplified by a linear amplifier. To separate the respective energy lines of radon, thoron, and actinon, a differential discriminator will be employed. The decay of the energy interval corresponding to each of the short-lived gases, actinon ($T_{1/2} = 4$ seconds), and thoron ($T_{1/2} = 54$ seconds), will be observed. An analysis of the decay curves provides an accurate estimate of the initial content. The relatively long-lived radon ($T_{1/2} = 3.8$ days) can be determined from the intensity of its radiation, because its half life is long compared with the time necessary for its measurement.

P-6-51

A Simple Laboratory Thermoelectric Pyrometer. R. M. Pierson and B. S. Garrett, University of Arkansas.

A thermoelectric pyrometer originally was constructed for measuring surface temperatures but it is especially suited for laboratory experiment or demonstration purposes. Its principal asset is simplicity of construction, the components consisting of materials usually found in a general physics laboratory or obtainable at low cost.

Method of construction is given and response curves of thermocouple E.M.F. vs. source temperature are discussed for a copper-constantan couple.

Response time to equilibrium is of the order of 30 seconds and the average thermal E.M.F. per 100°C source temperature is 60 microvolts when the source-mirror distance is 7.25 inches.

P-7-52

Preparation and Properties of Lead Sulfide Layers. J. A. Doughty, University of Arkansas.

Mirror-like layers of PbS can be precipitated chemically on nonconducting substrates by the method reported by Van Pick [*Ann. Phys.*, 126:12 (1949)]. Modifications of this method have resulted in satisfactory deposition of PbS on a substrate of copper. Techniques of cleaning substrates for deposition of thin films by evaporation or chemical means are reported.

Temperature-conductivity curves of PbS layers show characteristic "plateaus" or reversals of conductivity at temperatures of 290 to 320°F. This effect is explained in terms of moisture content.

P-8-53

Artificial Reverberation Generator. C. C. Allen and J. P. Decker, University of Arkansas.

Artificial reverberation is produced by means of a tape recorder with one recording head and two play-back heads. The delay and attenuation of sound, similar to that caused by sound waves in air transversing a room from wall to wall, is accomplished by the delay between the recording and pickup on the tape and a fixed attenuation of the signal before it is fed back each time to mix with the recording signal. This equipment makes experimental work in reverberation time convenient because of the ease with which the time can be changed.

SCIENCE EDUCATION SECTION

Chairman: Miss Marie Easterwood, Arkansas State College

SE-1-58

The Use of MKS Units in Elementary Physics Instruction. L. B. Ham, University of Arkansas.

In the past 10 years, the Giorgi (mks) system of units has become increasingly important and was adopted officially in January, 1948. Electrical standards are now based on the absolute practical system which replaces the older international units. The introduction of this system brings about a second approach to the study of electricity and magnetism. The two approaches, both being valid, are (1) teaching of magnetism by the traditional magnetic pole concept and (2) teaching the Amperian current method whereby magnetic fields are referred to electric currents of one kind or another.

Coulomb's law, with reference to charges and magnetic poles, is fundamental in the traditional approach; in the mks system, Coulomb's law with reference to charges and Ampere's law are fundamental.

The liberal arts type of physics text has worked little with the mks units. Some texts no more than merely mention the new system. Many of the technical and engineering physics texts are using the mks system with rationalization of the units in the section on electricity and magnetism.

Certain new teaching problems are encountered with the introduction of the mks units; these will be discussed in keeping with the following numbered items: (1) use of mks units in divisions of physics other than electricity and magnetism; (2) elimination of certain other systems of units; (3) sequence of topical matter in electricity and magnetism; (4) extent of minimizing the old concept involving H; (5) fourth unit; (6) rationalization; and (7) dual approach to a system of units defined on the one hand for theoretical considerations and on the other for actual measurement purposes.

SE-2-59

What is the Role of Biology in Modern Education? Joseph F. Marics, University of Arkansas.

In order to determine the role of biology in modern education, the objective of a beginning course in biology must first be established. This objective should be the same for the student who will not have another science course in his curriculum as for the biology major. As the scope of the objective is limited by the means of fulfillment, the main problem is to determine the best approach in the presenting the course.

First, the source of the vast accumulated data will be considered, then the dynamic pattern involved will be closely scrutinized. This is important because all future endeavor will follow this same pattern.

The other approach to this problem will be to show that, as the science of biology is not confined to narrow limits, points of interest can be established in numerous instances of reference for teaching purposes.

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SE-3-60

Report on the Pilot Course "Pattern of the Physical Sciences." Z. V. Harvalik, University of Arkansas.

The pilot course, "Pattern of the Physical Sciences." offered at the University of Arkansas, was repeated during the 1951-1952 school year.

It appears that the "spectral-line" approach of this course achieves a better understanding of the physical sciences than does the conventional "survey-type" course because of deeper penetration into the discussion topics. This seems to prove the assumption that transfer from a subject matter to general areas of human endeavor is possible only if a certain depth of understanding of the subject matter problems is achieved.

SE-4-61

Arithmetic for the Scientist and for the Common Man, or Death and Transfiguration of Grocery-store Arithmetic. B. H. Gundlach, University of Arkansas.

At the outset of the discussion the question is raised: What general attitudes should be cultivated in students who, later or simultaneously, have to take one or more courses in the various sciences? Certain of such basic attitudes are listed and discussed.

In the light of these listed attitudes, our present approach to the teaching of arithmetic and fundamental mathematics, in general, is analyzed and shown deficient. Its likewise obvious deficiency for the purposes of the nonscientific professional is highlighted by a number of recent public statements.

An alternative approach of an entirely new character then is presented and illustrated in several examples. It is emphasized here that the proposed new approach possesses not only the generally-desirable features of creativeness and enjoyment, but likewise satisfies *all* of the listed attitudes for the science student.

A brief outline of the main points in the development of the present grocery-store type of approach to arithmetic is followed by several concrete suggestions which lead to transformations of the "classical" methods into forms which, in a natural way, produce that kind of number handling and number familiarity which generally is recognized as a *pium desiderium*.

SOCIOLOGY SECTION

Chairman: M. J. Daniels, Arkansas Polytechnic College

S-1-62

The Probable Causes of Religious Apathy in our Institutions of Higher Learning, and the Proposal of a New Naturalism. George G. M. James, Agricultural, Mechanical, and Normal College.

Apathy to religion is treated as a complex effect. In order to determine the effect, an *a priori* approach is used, by means of which a study is made of the role of religion through the centuries, in order to discover religious error and policy, and to measure the gradual and cumulative apathy. A New Naturalism is recommended as the remedy, because it offers nature as a universal Bible, and the study of natural principles for the revelation of religious truths.

S-2-63

Progress Report on a Quantitative Study in the Sociology of Knowledge. Franz Adler, University of Arkansas.

The actual relationship of cultures in which epistemological thinking occurs to the type of such thinking were investigated. The philosophical implications of such relationships were disregarded.

The investigation was carried out by measuring certain characteristics of historical periods and by measuring correspondence to epistemological types, and by correlating the data, appropriately paired, by the usual techniques of correlation. The measurements were carried out by submitting historical periods to the judgment of historical experts and by submitting thinkers to the judgment of philosophical or sociological experts. The percentages of judges replying in any given manner were considered as indirect measures of correspondence to a given characteristic.

Some hypotheses of relationships were derived from the results obtained. These hypotheses were further verified and it was found that they deserved some confidence.

S-3-64

Some Anthropological Evidence Regarding the Possibility of Greater Social Control in the Economy of the Future. Paul F. Tjensvold, Arkansas Polytechnic College.

Recent interest in economic planning has caused a revival of interest in economic motivation, largely because it is not clear how there is to be coordination between activities of individual enterprises if each is guided solely by a desire for profits.

The most notable trait of primitive cultures is the diversity of ways in which they differ. Some seem to emphasize competition and acquisition. The Manus, in particular, accept competitive adult standards at maturity. Other peoples have emphasized nonaggressive activities. Some tribes seem to be motivated by acquisitive cultural patterns, although analysis shows that group approval is sought. However, primitive peoples commonly will not respond to new or unusual economic incentives. The meaning of this appears to be: Any new system of economic planning must be instituted at the adult level; each economic system will develop its own kind of human nature; during transitional stages, older forms of economic motivation may be useful; probably some forms of motivation, such as excessive competition, raise problems wherever used; and original human nature is not a limiting factor.

S-4-65

A Comparative Analysis of the Contributions of Emil Durkheim and His Contemporaries to Social Theory. J. E. Blackwell, Shorter College.

Emil Durkheim's contributions surpass those of Tarde, Le Bon, and Le Play, mainly because of his objective and pragmatic approach to the development of social thought.

Though disagreeing with much of the social philosophy of Comte and Montesquieu, his studies indicate the influence of their tradition.

Relative to his contemporaries, Durkheim opposes Tarde more so than he does Le Bon and Le Play. For Tarde, being influenced by Espinas, Hegel, and Cournot, defined social fact in terms of "imitation," and produced a theory of social interaction which is directly opposed to Durkheim's "Collective Representations." Tarde thought of Durkheim as being too "doctrinaire," and Durkheim of Tarde as being too "subjective." The four of them were directly influenced by France's political and social ills, as evidenced in their works.

Durkheim's eminence rests upon his superior empirical approach to research, his amazing ability to coordinate research, and his exceptional powers as a teacher.